III. REMARKS

A. Status of the Claims

Claims 1 to 44 are pending in this application. Claims 1-34 were previously amended. In this amendment, Applicants are making clarifying amendments to Claim 35 and have cancelled Claims 40 to 44 without prejudice.

B. Claim rejections – 35 USC § 103

Applicants have carefully considered the new document referred to by the Examiner, namely Enamito et al. In Enamito, there is no disclosure of an audio frequency sensor attachable to a surface of the window and no disclosure of generating a cancellation signal according to the noise detected in the window at any given time.

Considering Figure 6, described in paragraphs 0050 - 0052, there is disclosed a duct with branches having different lengths and having openings "located near to different sound sources 4, respectively". A loudspeaker 3 produces a complex sound including sounds of two frequencies f1 and f2 Hz. The ducting branches in such a manner that the branching point serves as an acoustic filter so that the two different frequency sounds are separated and delivered separately to a respective one of the branches 10 and 11.

It is important to understand that Enamito is concerned with constant and predictable noise, such as that emitted by an engine driving a power generator (see paragraph 0010). This is explained further in paragraph 0027, where it is made clear that a microphone is only used temporarily to measure the sounds produced by the sound source to produce a known frequency spectrum of sounds during setup. It points out that an alternative way of doing this is to calculate from the physical characteristics of the system the likely spectrum. Further, it is pointed out in paragraph 0028 that the noise is essentially low frequency noise.

The invention delivers its noise cancelling signal by means of the ducts to points as close as possible to the sound (i.e. noise) source – see paragraph 0032.

Paragraph 0069 refers, in any event, not to Figure 6, but to the "eighth embodiment" shown in Figure 10 (see paragraphs 0066 - 0068 as well). Figure 10 shows a duct surrounding the sound source, which is a window pane of a double glazed window. The duct has openings on each internal side, directed inwardly towards the window. While Paragraph 0069 does refer to suppressing sounds propagated through the window from outside the building or vehicle, there is no disclosure of any audio frequency sensor detecting noise outside the building etc, the sensor being linked to processing means to produce the cancellation signal according to what the sensor detects.

This is a critical distinction, because while the system disclosed in Enamito might serve to reduce the level of known low frequency sounds previously measured, it cannot deal dynamically with broad-spectrum sounds detected outside the building or vehicle.

Because Enamito depends on a loudspeaker driving a duct system, and because the distances from the loudspeaker to each duct opening will be different, the phase of the signal at each opening will be different. Since noise cancellation depends on the cancellation signal being exactly 180° out of phase with the noise signal, the Examiner will see that this could only be achieved by the Enamito system if the path lengths between the loudspeaker and the respective openings were each exactly related to the wavelength of the audio signal to ensure that the signals from the four openings were exactly in phase with each other, and 180° out of phase with the noise signal. While this might be achievable by careful design of the ducts for a specific noise frequency – for example a low frequency resonance signal from an engine exhaust – it would be completely ineffective for broad spectrum noise from random external sources such as aircraft and motor vehicles of different types and speeds passing the building.

By contrast, the present invention measures the noise signal in the window glass and dynamically applies the cancellation signal to the glass itself, thereby ensuring that sound is not transmitted into the room, or at least that the volume of sound transmitted is significantly reduced. This works because the cancellation signal is acoustically coupled into the window glass to cause a standing wave across the glass surface. Since the glass surface is also where the noise signal is detected, the phase difference considerations do not arise, and effective cancellation can be achieved. The audiofrequency actuator which emits the cancellation signal therefore needs to be directly attached to the glass of the window, rather than just being in proximity to it, in order to achieve acoustic coupling. Claim 35 has been amended to make this distinction clear.

The Examiner argues that the only difference between Enamito and the claimed invention is the absence of the encoding interface, and that Shoureshi supplies this. As explained above, this is not the only difference. A person skilled in the art applying the Shoureshi processing system to Enamito's duct system would not achieve dynamic noise reduction. The physical differences explained above ensure that such a system could not work. Additionally, Shoureshi is concerned with a system for handling low frequency vibration and noise signals to operate actuators such as body and engine mounts in vehicles to reduce vibration in these components leading to noise. The system "learns" the dynamics of the system to gradually optimize the response. Shoureshi does not disclose a dynamic response to broad-spectrum audio signals, and would not be suited to such a use.

For these reasons, combining the disclosures of Enamito et al and Shoureshi does not provide a teaching of the present invention and does not render it obvious to one skilled in the art.

Re Claim 36, there is no disclosure in Enamito or Shoureshi of a noise control device in which the microphone and the acoustic actuator are combined into a single device. The Examiner suggests that Enamito discloses this at paragraph 0027. However, paragraph 0027 states that the "frequency spectrum of the sounds produced by the sound source may be determined .... by measuring the sounds produced by the sound source when the device including the sound source

is operated temporarily by a microphone." While this may not be the clearest language, it does not say that the microphone is part of the acoustic actuator; it merely says that the microphone is used temporarily to measure the sounds produced by the sound source (i.e. the source of noise).

Re Claims 38 and 39, while the applicants would not dispute that noise due to aircraft or traffic is well-known, it is not a claim that the present invention provides such vibrations, but that it provides a system capable of reducing the perceived intensity of such sounds within the building. Neither Enamito, nor Shoureshi, alone or in combination, suggests a system capable of doing this.

Re Claim 37, the Examiner suggests that Wan discloses an arrangement in which the microphone and the acoustic actuator are combined into a single device which is a magnetostrictive actuator, and refers to Column 2, lines 41 to 45 of Wan in support of this. However, while Wan discloses the use of magnetostrictive actuators to generate cancelling vibrations (not sound, however, for which only loudspeakers are used in Wan), but does not disclose the use of such actuators operating as a microphone. Thus, the combination of Enamito, Shoureshi and Wan cannot render this claim obvious.

Re Claims 40-44, Applicants have cancelled these claims.

IV. CONCLUSION

Having noted and carefully addressed all of the outstanding rejections, Applicants respectfully submit that the RCE application is in condition for allowance. Applicants ask the Examiner to reconsider the amended claims in light of the arguments presented and issue a Notice of Allowance. Applicants are submitting herewith a Petition for a one-month Extension of Time and the required extension of time fee.

Respectfully submitted,

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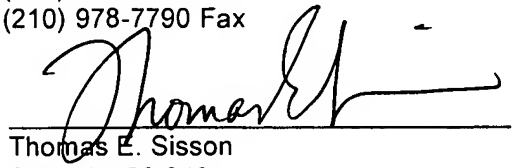

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